Petr Stepanov

Materials science. Data analysis. Desktop and web applications development. UI/UX design.

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Summary of Qualifications

Work Experience

Research Collaborator (On-Site)

[Thomas Jefferson National Laboratory (JLab)](https://www.jlab.org/), Newport News, VA, USA.

Jul 2020 - Current

* Used Machine Learning (ML) TMVA framework to perform binary classification of thousands of signals from a data acquisition (DAQ) set
* Applied CERN ROOT framework (C++) to perform statistical analysis of a significant amount (over 100 GB) of the raw exper
* Utilized SLURM environment on [JLab supercomputer environment](https://scicomp.jlab.org/scicomp/index.html) to run resou
* Proposed and implemented RAMDisk functionality on the development environment. This led to an over 60% increase in sourc
* Set up data acquisition system that performs triggered waveform acquisition from Tektronix oscilloscope to a local Netwo
* Committed 50+ shifts at the particle accelerator performing Target Operator and Shift Leader duties ([Pion LT project](h

Postdoctoral Researcher (Remote)

[Catholic University of America (CUA)](https://www.catholic.edu/index.html), Washington, DC, USA.

Jul 2020 - Current

* Developed a computer simulation based on the Geant4 framework (C++, CMake, Eclipse IDE, gdb) to study the optical properties of a no
    * Program accounts on scintillation material properties - composition, transmittance, luminescence.
        * Code reconstructs detector response (PMT or MPPC) depending on the quantum efficiency curve.
        * Visualization of optical photon trajectories concerning their energy or creator process.
    * Teaching experience. Mentoring students within a 3-month Research Experiences for Undergraduates (REU) program at th
* Enhanced debugging of the core library source code led to the publishing of more than [10 bug reports](https://root-foru

Research Assistant

[Bowling Green State University (BGSU)](https://www.bgsu.edu/), Bowling Green, OH, USA.

Aug 2014 - May 2020

* Assembled positron lifetime and Doppler spectrometers from ORTEC and Canberra (Mirion) fast electronic units. Utilized High-Purity G
* Developed three open-source programs (C++, CERN ROOT) for a novel interpretation of the positron lifetime and Doppler ex
    * Derived and solved kinetic equations describing the formation and chemical reactions of e+ and Ps atoms in solids, l
        * Incorporated physical parameters (grain size, defect concentrations, rate constants) into custom models (PDFs wi
    * Above research allowed for estimation of defect concentrations and sizes in solids, classification of defect types (
* Wrote three desktop GUI programs for spectra fitting and interpretation (C++, CMake, ROOT, Qt, Java)
    * GitHub repositories contain over 10k lines of code in total: [TLIST Processor](https://github.com/petrstepanov/tlist
        * Extended default ROOT GUI library (Qt-based) to support the MVP design pattern.
    * Wrote a GUI application [LuminApp](https://github.com/petrstepanov/luminapp) (Java, Swing) to parse and merge time-s
* Developed static website (Hexo, Gulp, Bootstrap) and visual identity for the [SelimLab](http://physics.bgsu.edu/selimlab
* Maintained local Apache HTTP server physics.bgsu.edu hosting over 10 websites at the BGSU.
* Created website for the [ICPA-18](https://physics.bgsu.edu/icpa18/) international conference with registration (over 150

Frontend Developer, UI/UX Designer • Freelance

Sep 2012 - Current

* Designed and built an online e-commerce store [Sticker Store LLC](https://bimmersticker.store/) with a static website generator (Fig
    * Improved the Google PageSpeed Insights metrics (CLS, LCP) up to 97%.
        * Created a recursive script to export over 300 products from YAML file to Google Merchant.
        * Optimized SEO. The project reached over 1400 organic monthly users.
    * Made iOS application (Swift, UIkit, storyboards) for the [We.Team](https://we.team/en/) messenger (more than 3k mont
* Migrated the landing page for [Sweetbridge](https://sweetbridge.com/) company from WordPress to Jekyll static site gener
* Developed the front-end part (Angular.js, HTML, LESS) for [Lili Social](https://myli.li/) network.
    * Assisted with iOS mobile application (Ionic).
        * Enabled SEO crawling of over 1000 Angular.js pages with Google bot.
    * Web design.
    * Designed logos, UI/UX prototypes (Figma, Sketch, Illustrator) and branding identity for over [10 different companies
        * Converted numerous design assets and mockups into responsive HTML and CSS.
        * Mocked up and integrated dozens of cross-browser responsive email templates.

Full Stack Web Developer, Web Designer

[Gridnine Systems](https://gridnine.com/), Moscow, Russia.

Apr 2011 - Aug 2014

* Prototyped and designed interactive mockups for [Otixo](https://we.team/en/) cloud file integrator (Balsamiq, Adobe Creative Suite).
* Responsible for the front-end development of the [ATH American Express](https://www.ath.ru/english/) – the largest trave
* Implemented image processing servlets on the backend to generate banners for five different social networks (PHP, ImageM
* Wireframed and sliced to web pages numerous UI/UX mockups for web applications (Balsamiq, Photoshop, HTML and CSS).

Computer Science Teacher

[Phys-Tech College at MIPT](https://mipt.ru/english/), Moscow, Russia.

Oct 2009 - May 2011

* Provided instructions and guidance to high school students on following computer courses: C/C++ programming, HTML, Adobe Photoshop a

Research Scientist

[Institute for Theoretical and Experimental Physics (ITEP)](https://en.wikipedia.org/wiki/ITEP), Moscow, Russia.

Sep 2008 - Apr 2011

* Application of positron lifetime spectroscopy for studying the radioactive-induced defects in steels. Monte-Carlo particle simulatio

Computer Science Skills

- **Essentials**. Git, SVN, SSH, Linux, and Terminal usage. BASH scripting. IDEs: Eclipse, Xcode, Visual Studio Code (VS Code).
- **Project management**. JIRA, Trello, GitHub, GitLab.
  - **Simulation and data analysis**: Geant4, CERN ROOT, MATLAB, Wolfram Mathematica, Maple.
  - **Academic writing**: LaTeX, MS Office Suite, Zotero.
  - **Data plotting**: Gnuplot, OriginLab, QtiPlot, SciDaVis, Grapher.
- **Desktop app development**. C/C++, GNU make, CMake. Frameworks: Qt, CERN ROOT, Geant4. Java and Swing. Python.
- **Frontend**: HTML, CSS (LESS and SASS), Bootstrap, responsive web design, JavaScript and jQuery, npm, gulp, AngularJS, React.js. Google Web Toolkit. PHP and WordPress themes development.
  - **Backend**. Node.js, Express.JS (EJS), Java.
  - **UI/UX design**. Figma, Sketch, InVision Studio, Adobe XD, Adobe Photoshop, Adobe Illustrator, Inkscape, Balsamiq, Blender.
  - **Apple iOS**. Fundamental Swift skills. User interface development with UIkit and storyboards.

Material Research Skills

- **Characterization facilities**. Positron Lifetime and Doppler Broadening Annihilation Spectroscopy (PALS, DBAR). Atom Probe Tomography (ATP). Scanning Electron Microscopy (SEM). Transmission electron microscopy (TEM). Atomic Force Microscopy (AFM). UV-VIS Spectroscopy. Fourier Transform Infrared Spectroscopy (FTIR).
- **Material processing**. High-temperature annealing. Wet chemical etching. Electrical Contact Fabrication. Sample polishing.

Education

Bowling Green State University (BGSU) • Ohio, USA

Aug 2014 - May 2020

Ph.D. in Photochemical Sciences • GPA 3.423. Novel developments in positron annihilation spectroscopy techniques—from experimental set
* Assembled and utilized two spectrometers: positron lifetime and Doppler. Spectrometers are built from ORTEC and Canberra (Mirion) fa
    * Developed open-source software (C++, CERN ROOT) for a novel interpretation of the experimental spectra.
    * Defined and resolved kinetic equations of reactions of positron and positronium atoms (Ps) in solids and liquids and nano-powder
    * Above research allowed for the estimation of defect concentrations and sizes in solids, classification of defect types (vacancie

Ohio Supercomputer Workshop • Ohio, USA

Jan 2017 - Feb 2017

Hands-on sessions in Supercomputer Essentials. Introduction to the key developments in the supercomputer field.
* RedHat and CentOS operating systems: environment, networking, and SSH.
    * Supercomputer job control with BASH and SLURM scripts.
    * CMake compiling platform, use of parallel nodes, A.I. fundamentals and more..."

British Higher School of Art and Design (BHSAD) • Moscow, Russia

Dec 2011 - Feb 2012

Three-month intensive in Graphical Design and Visual Communications. Lectures and hands-on experience in graphic design and user inter
* Intensive covered following subjects: brand identity, illustration principles, typography and lettering, effective advertising campa

National Research Nuclear University (MEPhI) • Moscow, Russia

Sept 2004 - Feb 2011

B.S. and M.S. in Solid State Physics. Defect studies of neutron-irradiated nuclear power plant vessel steels by means of positron anni

Featured Publications
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* P. S. Stepanov, F. A. Selim et al. Interaction of positronium with dissolved oxygen in liquids. *Physical Chemistry Chemical Physics
* P. S. Stepanov, F. A. Selim et al. A model for joint processing of LT and CDB spectra of dielectric nano-sized powders. *AIP Confere
* P Saadatkia, P Stepanov et al. Photoconductivity of bulk $SrTiO_3$single crystals at room temperature. *Materials Research Express* **2
* P.S. Stepanov, S.V. Stepanov et al. Developing New Routine for Processing Two-Dimensional Coincidence Doppler Energy Spectra and Eva
* J. Ji, A. M. Colosimo et al. ZnO Luminescence and scintillation studied via photoexcitation, X-ray excitation and gamma-induced posi

Conferences

18th International Conference on Positron Annihilation (ICPA-18)

Aug 2018

Orlando, FL, USA

Oral talk "Positions and Ps in Al_2O_3 Nanopowders

International Workshop on Physics with Positrons (JPos17)

Sept 2017

JLab, Newport News, VA, USA

Poster "A routine of background subtraction from two-dimensional Doppler broadened spectra"

12th International Workshop on Positron and Positronium Chemistry (PPC12)

Sept 2017

Maria Curie-Sklodowska University, Lublin, Poland

Poster "Developing new routine for processing two-dimensional coincidence Doppler energy spectra"

Ohio Photochemical Society Meeting (Oops)

May 2017

Maumee Bay Lodge & Conference Center, Maumee, OH, USA

Poster "Developing new routine for background subtraction in two-dimensional coincidence Doppler broadening spectroscopy"

58th Electronic Materials Conference (EMC)

Jun 2016

University of Delaware, Newark, DE, USA

Oral talk "High-Sensitivity Measurements of Defects in ZnO by Means of Digital Coincidence Doppler Broadening of Positron Annihila

Annual Spring Meeting of the APS Ohio-Region

Apr 2016

University of Dayton, Dayton, OH, USA

Oral talk "Identification of chemical environment of defects in ZnO by means of digital coincidence Doppler broadening of positron

Ohio Inorganic Weekend

Nov 2015

Bowling Green State University, OH, USA

Poster "Approaching Structural Defect Characterization and their Chemical Identification by Means of Coincidence Doppler Broadenin

41st Polish Seminar on Positron Annihilation (PSPA-13)

Sep 2013

Maria Curie-Sklodowska University, Lublin, Poland

Oral talk "Application of positron spectroscopy for detection of nanostructures in alcohol–aqueous mixtures"

Professional Networks

- Discover my professional contacts on LinkedIn (200+ connections).
  - Get familiar with my scientific career on ResearchGate.
  - Skim through the list of my publications on Google Scholar (24 articles, 200+ citations).
  - Find examples of my code on GitHub (50+ repositories).
  - Check out my UI design portfolio on Dribbble (50+ shots).

Interests

Linux and open-source software. Hosting an open-source project for keyboard remapping on Linux (300 stars on GitHub).